

Research Article

COMPREHENSIVE ASSESSMENT OF PATTERNS OF MAXILLOFACIAL TRAUMA AND CO-EXISTING HEAD INJURY: A RETROSPECTIVE STUDY

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ABSTRACT

Objectives: The chief objective of this retrospective study was to do a comprehensive assessment of patterns of maxillofacial trauma and co-existing head injury if any, in patients referred to the oral & maxillofacial surgery department of the only dental college in the largest educational city of India.

Material & Methods: The registered OPD files and CT scans of all Oro-maxillofacial trauma cases reported to the Department from January 2012 to January 2014 were retrospectively studied. The available data of 486 cases were retrospectively and comprehensively assessed based on patient's age, gender, cause of injury, site of injury and if any co-existing head injury.

Results: Out of 486 maxillofacial trauma cases reported, there were 412 (84.7%) males and 74 (15.3%) females. Age predilection was more between 15-30 years age group i.e. 199 patients (41%) followed by 31-45 years i.e. 146 patients (30%). The most important cause of maxillofacial trauma seen was road traffic accidents (57.8%) i.e. 281 patients followed by assault (34.7%) 169 cases and trauma due to fall (7.4%) 36 patients. Only soft tissue injury was seen in 22 patients (4.5%) while remaining 464 patients has soft tissue trauma along with bony injury (95.5%). Most affected site of injury out of 464 bony injury cases, was mandible 252(54.3%), maxilla (Le Fort) 103 (22.1%), zygomatic bone 48 (10.3%), nasal bone 21(4.5%), orbital bone 19(4.0%), dento-alveolar 15(3.2%) and frontal bone 6(1.2%). Total 176 cases (36.2%) had co-existing head injury along with maxillofacial trauma.

Conclusion: Young males are subjected more to maxillofacial trauma mainly due to road traffic accidents. Though mandible is commonly affected bone but almost all facial bones are vulnerable to trauma. Maxillofacial injuries are oftenly associated with head injuries so an immediate comprehensive management is required for such patients.

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INTRODUCTION

Face being the most exposed part of the body, is more prone to traumatic injuries. Maxillofacial trauma occurs in various patterns and amounts to significant proportion of medico-legal cases thus being a matter of great concern for the society [1]. Starting from base of the skull to the hyoid bone, maxillofacial trauma can possess a threat to life if airway is compromised and if accompanied by any co-existing severe head injury [2]. It may also compromise important functions like mastication, deglutition, smell, sight and at times may result in permanent dystrophy of face putting significant psychological impact on the patient [3]. Maxillofacial trauma has a strong association with traumatic brain injuries, which co-exists with it with a significant incidence rate of 8.1% [4].

Epidemiology of maxillofacial trauma differs with specific demography and is monitored by the cultural heritage, socio-economic status, life style and population concentration [5]. In a developing country like India, road traffic accidents are still the main cause for occurrence of maxillofacial trauma [6], whereas in developed countries assault amounts to major maxillofacial trauma cases [7]. There is a myriad of literature focusing on epidemiological assessment of maxillofacial trauma in India and abroad, however there is still limited data on complete knowledge on patterns of maxillofacial trauma in developing countries. Our study aims at comprehensive retrospective analysis of various patterns of maxillofacial trauma among patients reporting to the only dental college in a thickly student populated educational city of India.

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MATERIAL AND METHODS

This retrospective study was done at department of oral and maxillofacial surgery, Daswani dental college and research centre, Kota.

The basis of study was the data obtained from the registered OPD files and CT scans of all Oro-maxillofacial trauma cases reported to the department from January 2012 to January 2014. After obtaining ethical committee clearance, the available data of 486 cases were retrospectively and comprehensively scrutinized based variables of patient's age, gender, cause of injury, site of injury and if any co-existing head injury. The results were statistically analyzed and were interpreted using percentage wherever necessary. The protocols of the analysis were performed in accordance with declaration of Helsinki [8] and none of the authors have any conflict of interest regarding this study.

RESULTS

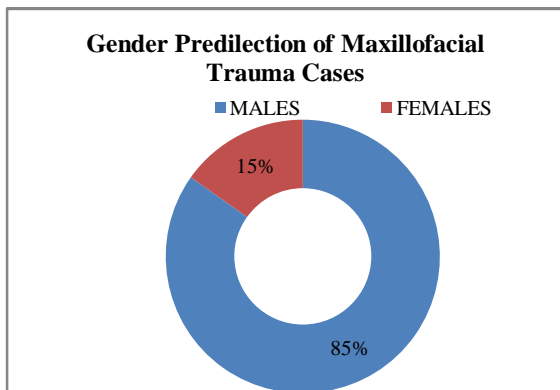
Demographic Analysis

Maxillofacial trauma accounted for 15% (486) out of total 3252 patients who reported to the department of oral and maxillofacial surgery from January 2012 to January 2014 [TABLE 1].

Table 1 Number of maxillofacial trauma cases among total number of OPD patients

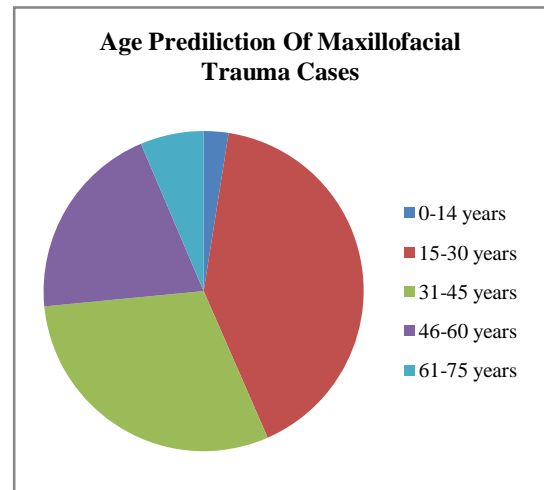
Total OPD patients in department from January 2012 to January 2014	Total number of maxillofacial trauma cases out of total OPD from January 2012 to January 2014
3252	486 (15%)
	Soft tissue injury only 22(4.5%)
	Both Soft tissue & Bony injury 464(95.5%)

The percentage of male patients 84.7% (412) was much more than the female patients 15.3% (74), with a male to female ratio of 5.6:1 [GRAPH I].



Graph I Gender Predilection of Maxillofacial Trauma Cases

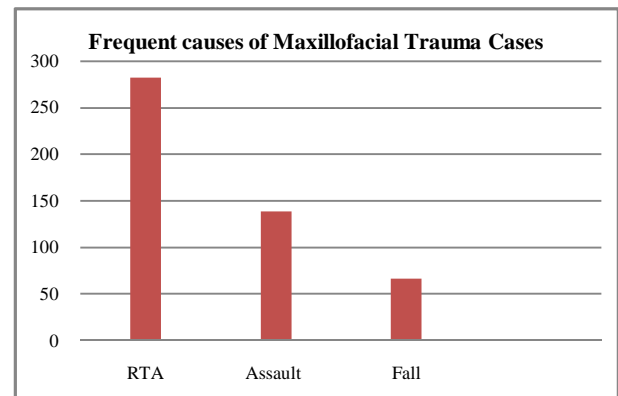
The age of the patients ranged from 0 to 75 years with a mean age of 39.2 years. Age predilection for maxillofacial trauma was more between 15-30 years age group 41% (199 patients), followed by 31-45 years 30% (146 patients) and least among new born to 14 years 2.4% (12 patients) [GRAPH II].



Graph II Age Predilection of Maxillofacial Trauma Cases

Etiology of Trauma

The most important cause of maxillofacial trauma analyzed was road traffic accidents 57.8% (281 patients), followed by assault 34.7% (169 patients) and trauma due to fall 7.4%(36 patients) [GRAPH III].



Graph III Frequent causes of Maxillofacial Trauma Cases

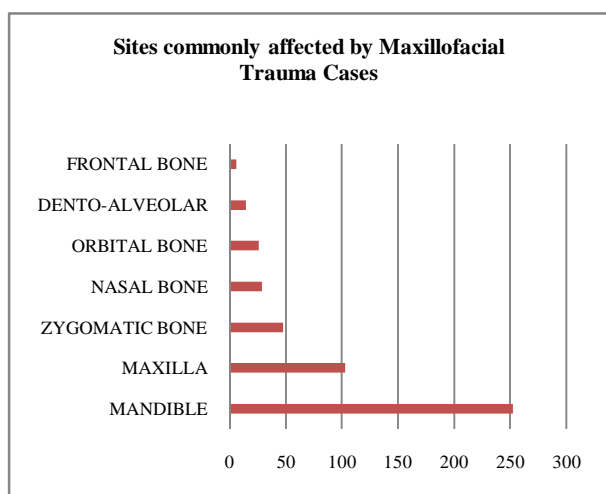
Pattern of Injury

Out of 486 cases of maxillofacial trauma, exclusive soft tissue injury was seen in 4.5% (22 patients) while remaining 464 patients had soft tissue trauma along with bony injuries (95.5%) [TABLE 1]. The pattern of soft tissue injury depicted that out of 22 patients, 27.2% (6 patients) had soft tissue injury on upper 1/3rd of the face, 18.1%(4 patients) on middle 1/3rd of the face and maximum affected was the lower 1/3rd of the face 54.5% (12 patients) [TABLE 2].

Table 2 Pattern of soft tissue injuries among 22 cases of soft tissue injury only

Pattern of soft tissue injury	Number of patients	Percentage %
Upper 1/3 rd of the face	6	27.2%
Middle 1/3 rd of the face	4	18.1%
Lower 1/3 rd of the face	12	54.5%

Most affected sites of trauma out of 464 bony injury cases, was mandible 54.3% (252 patients), maxilla 22.1% (103 patients), zygomatic bone 10.3% (48 patients), nasal bone 4.5% (21 patients), orbital bone 4.0% (19 patients), dento-alveolar 3.2% (15) and least affected was frontal bone 1.2% (6 patients) [GRAPH IV].



Graph IV Sites commonly affected by Maxillofacial Trauma Cases

In detailed scrutiny of patterns of maxillofacial trauma in mid face and upper 1/3rd of face we found that there were total of 43.9% (204 patients) of mid face and upper 1/3rd of face trauma out of 464 cases of bony injury. Among these 29.9% (61 patients) were with Le Fort I fracture, 13.7% (28 patients) with Le Fort II fracture and only 6.8% (14 patients) who reported with Le Fort III fracture. There were 3.4% (7 patients) with dento-alveolar fracture in maxilla along with zygomatic bone 23.5% (48 patients), nasal bone 10.2% (21 patients), orbital bone 9.3% (19 patients) and frontal bone 2.9% (6 patients) [TABLE 3]. So Le Fort I fracture occurred more frequently followed by zygomatic bone fractures and pattern was seen least in frontal bone fracture.

Table 3 Pattern of Mid-Face & Upper 1/3rd of face fractures among 204 cases of Mid-Face & upper 1/3rd of face fractures only

Pattern of Mid- Face % upper 1/3 rd of face fractures	Number of patients	Percentage %
Le Fort I	61	29.9%
Le Fort II	28	13.7%
Le Fort III	14	6.8%
Zygomatic Fracture	48	23.5%
Nasal Bone Fracture	21	10.2%
Orbital Bone Fracture	19	9.3%
Frontal Bone Fracture	6	2.9%
Dento-alveolar Fracture in Maxilla	7	3.4%
Total	204	100%

Similarly, on thorough analysis of mandibular fractures 54.3% (252 patients) along with 3% (8 patients) of dento-alveolar fracture in mandible it amounted to 56% (260 patients) out of 464 cases of bony injury.

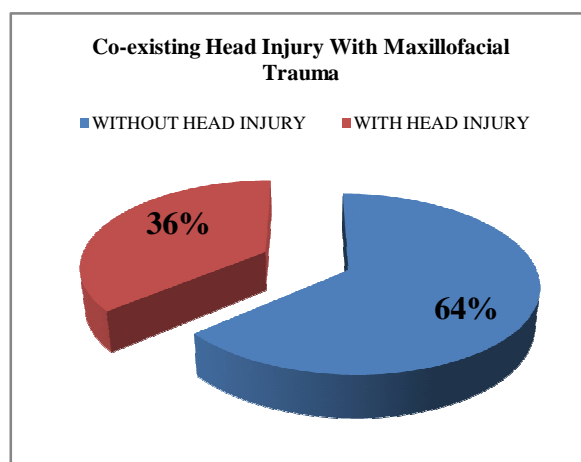
Table 4 Pattern of Mandibular fractures

Pattern of Mandibular fractures	Number of patients	Percentage %
Symphysis	41	15.7%
Parasymphysis	57	21.9%
Body	42	16.1%
Angle	21	8.0%
Ramus	5	1.9%
Condyle	84	32.3%
Coronoid	2	0.7%
Dento-alveolar fractures in Mandible	8	3.0%
Total	260	100%

Most commonly affected site in mandible was condyle with 32.3% (84 patients), followed by parasymphysis fracture 21.9% (57 patients). Body of mandible was affected next with 16.1% (42 patients) and Symphysis with 15.7% (41 patients). Angle fracture was comparatively less with 8.0% (21 patients) and least was observed in ramus 1.9% (5 patients) and coronoid 0.7% (2 patients) [TABLE 4].

Co-Existing Head Injury:

Out of all 486 cases of maxillofacial trauma we found 36.2% (176 patients) with associated head injury which is quite significant. [GRAPH V]



Graph V Co-Existing Head Injury with Maxillofacial Trauma

DISCUSSION

The ongoing continuous assessment of trends of maxillofacial trauma in various parts of the world has revealed significant variations in patterns of facial injury, which is highly influenced by geographic location, cultural heritage, population drift and socioeconomic conditions [9].

Though patients from all age group are affected with maxillofacial trauma, the peak incidence was seen more in age group of 15 to 30 years, which is similar to another such study done in India on 1000 cases in 2012 by Kapoor P and Kalra N in Delhi [10]. The probable reason for this could be that in age of adolescence and 3rd decade of life people are more energetic, adventurous and in search of livelihood thus making them more prone to road traffic accidents, assault and fall in sports or injuries due to fall.

Our study saw a male preponderance to maxillofacial trauma than female with a male to female ratio of 5.6:1, which was near to the above mentioned studies but higher than the studies done in neighboring developing countries like one in Pakistan in 2016 on 302 patients by Khan MM *et al* [11]. The male predilection over female can be attributed to the fact that males are more socially involved in life threatening activities, driving, sports and violence where as females are more prone to domestic violence.

In a thickly populated country like ours with bizarre traffic sense among people, road traffic accidents still account for highest number of maxillofacial trauma as shown by our study. Many such studies like one by Van Hout *et al* in 2013 [12], Mohajerani SH *et al* in 2011 [13] and by Sawhney P in 1988 in India [14] are in accordance with our study that road traffic accidents are prime cause of maxillofacial trauma, but

there are other studies like one mentioned above [10] and another by Hussain K *et al* [15] who have done a comprehensive analysis and reported that physical assault amounts to more maxillofacial trauma than road traffic accidents.

Soft tissue injuries along with bony injuries were found much more than exclusive soft tissue injury only, in our study which is contradictory to the study by Le BT *et al* in 2001 [16] and also studies discussed above [7] [10] who showed that exclusive soft tissue injuries are in much more preponderance that soft tissue trauma along with bony injury. The reason to this could be that all such studies have reported physical assault as major cause of maxillofacial trauma which has lesser impact comparatively than road traffic accidents, thus leading to trauma sustaining mainly up to soft tissues. Road traffic accidents have more impact resulting in bony injuries along with soft tissue trauma.

Mandible was the most affected bone due to maxillofacial trauma followed by maxilla and zygomatic bone fracture being the next in our study. A study by Garg V and Singh H on 130 maxillofacial trauma cases in India supports our finding of mandible being the most affected facial bone [17]. Our finding is in sync with those of Lida *et al* who analyzed 1502 patients in 2001 in Japan [18], Motamedi who did a 5 year analysis on 237 patients in 2003 in Iran [19], and Erol *et al* who studied 2901 patients in Turkey [9]. The only study which showed results contradictory to ours was by Arslan E *et al* on 754 patients in 2014 as they depicted maxilla being the most affected bone and mandible merely 8% [20]. The explanation to this relates to the anatomic protuberance of mandible on the face making it more vulnerable to maxillofacial trauma. In mandibular fractures, our study showed condyle getting frequently affected followed by parasymphysis and then symphysis and body of mandible being the next. It is in accordance with studies done in India as discussed earlier [10] [17] and also in accordance with the study by Almasri M in 2013 on 101 cases in Saudi [21].

We found 36.2% (176 patients) in our study with associated head injury which is quite significant. According to Keenan *et al*, patients with maxillofacial trauma have a high risk of head injury when compared to those without maxillofacial trauma [22]. Haug and associates depicted that incidence rate of head injury along with maxillofacial trauma is 17.5% [23].

Since our study was done at a densely populated area, so it can be used as a tool to assess maxillofacial trauma patterns in western India and could also be of immense help in teaching and training health care professionals about changing trends of facial trauma.

CONCLUSION

Young males are subjected more to maxillofacial trauma mainly due to road traffic accidents. Though mandible is commonly affected bone but almost all facial bones are vulnerable to trauma. Maxillofacial injuries are oftenly associated with head injuries so an immediate comprehensive management is required for such patients.

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